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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte RUTHIE D. LYLE,
JAMEL PLEASANT LYNCH, JR.,
USEN E. UDOH, and WILLIAM VIGILANTE, JR.

Appeal 2008-3494
Application 10/064,269
Technology Center 2600

Decided: November 25, 2008

Before JOSEPH F. RUGGIERO, JOHN A. JEFFERY,
and KARL D. EASTHOM, *Administrative Patent Judges*.

EASTHOM, *Administrative Patent Judge*.

DECISION ON APPEAL

The Appellants appeal under 35 U.S.C. § 134 from the Examiner's rejection of claims 1 through 20. No other claims are pending. (App. Br. 1). We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

STATEMENT OF THE CASE

Appellants' invention relates to methods for determining interference in frequency hopping systems including those employing Bluetooth ™ and the closely related IEEE 802.15.1 standards (Spec. ¶¶ 0003, 0009, 0010). To minimize interference, the prior art Bluetooth™ frequency hopping (FH) standard calls for Bluetooth devices to "hop" on all 79 channels within the ISM band (2.4 GHz to 2.480 GHz). (Spec. ¶¶ 0001, 0006). That is, the devices transmit only a certain amount of data on a channel before "hopping" to another channel. The standards establish criteria for hopping – how much data to transmit, when to hop, and the order in which to hop to each channel. (Spec. ¶ 0006).

Other devices, such as baby monitors, microwaves, etc. also operate in the ISM band and therefore interfere with the Bluetooth devices. (Spec. ¶¶ 0002, 0005). The Bluetooth standard calls for re-transmitting data when data is lost due to such interference, which decreases the data rate (Spec. ¶ 0007).

Appellants' method entails identifying FH channels experiencing interference, marking those channels, and when a device hops to that channel, transmitting only null data packets instead of normal data packets (Spec. ¶ 0010). Normal data packets are transmitted to non-interfering channels. (Spec. ¶ 0023).

Claim 1 is representative of the claims on appeal:

1. In a wireless communications system providing for communication over two or more channels utilizing a communications architecture that calls for hopping from channel to channel during data transmission, a method for mitigating the effects of interference, the method comprising:

scanning the channels for interference and identifying channels experiencing interference;

transmitting only null packets when hopping to a channel identified as experiencing interference; and

transmitting normal data when hopping to a channel not identified as experiencing interference.

The Examiner relies on the following prior art references to show unpatentability:

Gan	US 7,027,418 B2	April 11, 2006

1. Claims 1 through 20 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Gan.

The Appeal Brief (filed March 15, 2007), Reply Brief (filed October 17, 2007) and the Examiner Answer (mailed August 24, 2007) are referenced for their respective details.

ISSUES

As outlined below, Appellants assert that the Examiner erred in finding that Gan teaches several limitations of the claims. Based on Appellants' arguments (App. Br. 4-14), the Examiner's rejection of claims 1 through 20 over Gan (Ans. 3), and our authority under 37 C.F.R. § 41.37(c)(1) (vii), we group the claims as follows: a) 1, 6, 8, 9, 12, 17, and 18; b) 2; c) 3; d) 4, 13; e) 5, 14,[1] and 18; f) 6, 15, and 19; and g) 7, 10, 11, 16, and 20.

[1] Appellants correct the initial grouping of claim 12 here in their Reply Brief (Reply Br. 4).

Thus, the issue before us is: Did the Appellants demonstrate that the Examiner erred in finding that Gan teaches the disputed limitations?

PRINCIPLES OF LAW

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the Examiner to establish a factual basis to support the legal conclusion of obviousness. *See In re Fine*, 837 F.2d 1071, 1073 (Fed. Cir. 1988). In so doing, the Examiner must make the factual determinations set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966).

If the Examiner's burden is met, the burden then shifts to the Appellant to overcome the prima facie case with argument and/or evidence. Obviousness is then determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments. *See In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992).

The Examiner's articulated reasoning in the rejection must possess a rational underpinning to support the legal conclusion of obviousness. *In re Kahn*, 441 F.3d at 988 (Fed. Cir. 2006). As to the conclusion of obviousness:

> [W]hen a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result….
>
> ….
>
> …For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill. *Sakraida* and *Anderson's-Black Rock* are illustrative – a court

> must ask whether the improvement is more than the predictable use of prior art elements according to their established functions.

KSR Int'l Co. v. Teleflex Inc., 127 S. Ct. 1727, 1740 (2007).

FINDINGS OF FACT (FF)

1. Gan teaches several techniques for selecting channels based on channel performance according to a frequency hopping (FH) protocol. (Col. 3, ll. 49-66). Gan primarily employs the IEEE 802.15.1 Wireless Personal Area Network standard protocol, based on Bluetooth™ technology. (*See* Col. 2, ll. 3-8; col. 8, ll. 9-13).

2. One embodiment of Gan's method to measure performance entails sending special test data packets to some or all 79 channels of the IEEE 802.15.1 or Bluetooth ™ standard and determining the number of error bits (NEB) of the packets. (Col. 7, ll. 47-65; col. 10, ll. 16-30). The channels are ultimately classified as "good" or "bad" based on the interference and performance measures. (*See e.g*. col. 15, Table 1).

3. Gan's preamble correlation test method is similar to the special test packet test method. (Col. 12, ll. 55-60). A standard data "packet" under the IEEE 802.15.1 or Bluetooth™ standard comprises a known preamble, a packet header, and a payload. (Col. 10, ll. 43-49, Fig. 3A). The preamble correlation approach involves correlating the known preamble to determine if the preamble arrived with all bits intact. (Col. 12, l. 54 to col. 13, l. 11).

4. Gan's preamble method includes sending null data packets having a known preamble header to determine continually if channels change from "good" or "bad." (Col. 12, l. 54 to col. 13, l. 11). The Examiner (Ans. 6) quotes Gan col. 12, ll. 22-32) for the teachings, *inter alia*, that such null

packets: generally contain only an access code and packet header; are typically used to synchronize a master or a slave; and ensure that there is no return packet sent from the slave to the master.

5. Gan's RSSI (received signal strength indicator) test indicates interference noise, and also involves sending only null packets. "To determine the RSSI for a channel, a master can either just listen at a slave transmission slot or the master [sic] or send a null packet to a slave to ensure that slave will not transmit at the next transmission slot." (Col. 12, ll. 21-28). The RSSI method tests the system at start-up and thereafter. It involves scanning and rescanning some or all of the channels by a master hopping to each channel with the null packet and thereafter "listening" to background noise to determine the noise floor. Thus, the RSSI rescanning method monitors interference changes. The RSSI and/or preamble method, or any other of Gan's methods, may be used for initial testing and/or rescanning periodically, during normal data transmission, and/or according to performance thresholds. (Col. 5, ll. 63-67; col. 7, ll. 15-19, ll. 51-55; col. 8, ll. 20-29; col. 9, ll. 6-16; col. 12, ll. 21-53; col. 21, ll. 10-49; col. 22, ll. 18-30; Figs 6a-6c). For example, Gan's system retests and "switches back" to a set of default channels, which have already been classified into sets of "good" and "bad" channels. The "switch back" can be based on either an expiration of time (GCUT), or any interference/ performance threshold, such as a previously designated number of good channels becoming bad, using the same initial RSSI or preamble test or any other test. (Col. 22, l. 48 - col. 24, l. 10' Figs. 6a-6c). Combinations of tests can be employed. For example, a master can send only nulls using the RSSI test, while slaves can

send nulls back to the master using the preamble test (col. 11, ll. 28-32, col. 14, ll. 18-31).

6. The Examiner (Ans. 7) quotes Gan: "*Interference results in data transmission errors, such as an increase in the bit error rate (BER), or loss of data packets, resulting in reduced transmission quality and performance and the need to retransmit the data.*" (Gan, col. 3, ll. 17-20). Gan also teaches that under the Bluetooth™ or IEEE 802.15.1 standard, data packets that do not pass a CRC (redundancy) test must be retransmitted and that such retransmission indicates poor channel performance. (Col. 13, ll. 35-38).

7. Gan teaches that one or more RSSI and/or preamble tests, or any tests, for each channel may be performed and the results aggregated. Interference conditions change so that retesting also occurs. A channel experiencing heavy interference may be designated as low or high in RSSI noise in one such test, but then, successive tests may be aggregated to designate the channel as "good" or "bad." (*See generally*, col. 14, l. 17 to col. 17, l. 10; Table 1, Table 2). Slaves and masters communicate using a set of channels designated as "good." (Col. 18, ll. 49-51).

8. Appellants' disclosed system sends only null data packets to channels that have been marked as interfering. "If [the device] is hopping to a channel currently marked as experiencing interference, only null packets, that is, packets containing no data, are transmitted on such channel. If it is hopping to a channel that is not currently marked as experiencing interference, normal data packets are transmitted." (Spec. ¶ 0023).

9. Appellants explain that since the transmitter knows a null packet was sent, the transmitter avoids the need to re-send it. (Spec. ¶ 0023).

10. Appellants further explain that “[t]he Bluetooth[™] standard calls for re-transmitting packets when data is lost in transmission, typically due to interference.” (Spec. ¶ 0007).

11. Appellants state: “Devices capable of wireless communications according to the Bluetooth[™], IEEE 802.15.1 and other standards and the various methods and technologies employed by such devices to transmit and receive data are well known to persons skilled in the relevant arts.” (Spec. ¶ 0020). Appellants also state: “This method does not require changes to the standards definitions nor does it require any modification to the receiving device.” (Spec. ¶ 0010).

ANALYSIS

Claims 1, 8, 9, 12, and 17

The central issue involved here is: Did the Appellant’s demonstrate error in the Examiner’s finding that Gan teaches “transmitting only null packets when hopping to a channel identified as experiencing interference” as recited in representative claim 1? The Examiner found that since Gan’s system does not transfer any packets when hopping to a channel identified as experiencing interference, and a null packet has no data, it would have been obvious to transfer a null packet in place of not transferring data. (Ans. 5-7). The Examiner reasoned (Ans. 7) that Gan’s method was functionally equivalent to Appellants’ method because in each case, the need to re-send data is avoided.

For support, the Examiner compared Gan’s (FF 6) teachings to Appellants’ disclosure (Ans. 7, *quoting* Spec. ¶ 0023 - *see* FF 8, 9 partially quoting and summarizing Spec. ¶ 0023). Based on our findings above (FF 5,

6, 8-11), we agree with the Examiner: Appellants' and Gan's methods similarly avoid the need to re-transmit data and thereby enhance transmission quality.

The Examiner also quoted Gan for a teaching, *inter alia*, that sending a null packet ensures that a slave will not transmit an acknowledgement back to the master (FF 4, 5). In other words, Gan teaches that, upon sending only a null packet, the master transmitter does not wait for re-transmission (i.e., acknowledgement) back from the slave (*see* FF 4-6). On the other hand, pursuant to the well-known Bluetooth™ and other existing standards, upon sending a normal data packet, the master transmitter does wait for acknowledgement from the slave, and if none arrives, the transmitter re-sends the data. Such waiting and re-transmission reduces transmission quality according to Gan. (*See* FF 4, 6, 10, 11).

Further, Gan teaches, as quoted by the Examiner, that nulls help to synchronize master and slave communications without instigating re-transmission (FF 4-6). Such synchronization benefits the system even during interference - because the interference changes and "bad" channels become "good" (FF 5, 7). In addition, Gan teaches, as also quoted by the Examiner, that transmitting nulls during the RSSI and/or preamble tests provides system performance/interference monitoring. (Ans. 6; FF 5, 7). Gan also specifically teaches that sending a null provides more than "just listen[ing]," i.e., it ensures synchronization and no slave retransmission. (FF 5). Therefore, we find that at a minimum, the Examiner has at least set forth a *prima facie* case as to why a skilled artisan, attempting to avoid re-transmission and provide synchronization, would have sent null packets instead of not sending any packets.

Appellants generally assert *inter alia* that the Examiner's position lacks objective evidence and a suggestion to support the modification of Gan, and is based on an improper design choice analysis (App. Br. 3-5). Appellants also characterize the Examiner's evidence as based merely on the additional recognition that Gan's and Appellants' methods both avoid interference. (Reply Br. 2-3). As we found above, the Examiner's rationale involves more. As such, Appellants do not demonstrate error in the Examiner's obviousness rationale.

Under *KSR*, given Gan's desire to avoid re-sending data and consequent system degradation, combined with Gan's teaching (supplemented by well-known protocols) that sending null packets, as opposed to mere listening, ensures no such re-sending, and further provides for interference monitoring and synchronization, modifying Gan's method of sending only null packets to monitor all channels, and instead, sending only null packets to monitor interfering channels, would have involved no "more than the predictable use of prior art elements according to their established functions." *KSR*, 127 S.Ct. at 1740. Moreover, Appellants do not assert, and the record does not support, that such a modification would have involved more than ordinary skill or provided any surprising benefit.

Under an alternative interpretation of claim 1, we determine that the method does not preclude performing the scanning and first transmitting steps concurrently. Nor does the first transmitting step preclude transmitting only null packets when hopping to *all* channels during or after the scanning step. Claim 1 recites, *inter alia,* "the method *comprising*: scanning the channels for interference and identifying channels experiencing interference;

transmitting only null packets when hopping to a channel identified as experiencing interference" (emphasis added).

Thus, Gan's RSSI method of resending only null packets to all channels and listening for noise interference (i.e., rescanning) during the test, after some of the channels have been designated initially as interfering, or initially "bad" while the channel test results are being aggregated (FF 5, 7), constitutes "transmitting only null packets when hopping to a channel identified as experiencing interference," as claim 1 requires. Thereafter, Gan's system master and slave communicate on good channels (FF 7), thus anticipating claims 1, 12 and 17.

In support of our finding, we note that Appellants disclose sending only null packets to those channels "*currently marked* as experiencing interference," (FF 8) (emphasis added), but do not claim such a feature. We also note that the claim is open-ended, and does not recite sending null packets *only to channels identified as experiencing interference*. "[E]ach claim does not necessarily cover every feature disclosed in the specification. When the claim addresses only some of the features disclosed in the specification, it is improper to limit the claim to other, unclaimed features." *Ventana Medical System, Inc. v. Biogenex Labs., Inc.*, 473 F.3d 1173, 1181 (Fed. Cir. 2006).

Appellants also assert that Gan does not teach scanning on power-up as called for in claims 12 and 17. (App. Br. 6). The Examiner quoted Gan as teaching that "<u>an initial set of channels is selected based on one or more selection criteria at the start-up of the communication network</u>." (Ans. 8). We find no difference between selecting at start-up and scanning on power-up, nor do Appellants argue or disclose any difference as necessary to

support any claimed distinction over Gan. Further, Gan specifically discloses "rescanning," (col. l. 21, l. 22), which necessarily means initial scanning occurred (FF 5).

In summary, Appellants did not demonstrate error in the Examiner's finding that Gan teaches "transmitting only null packets when hopping to a channel identified as experiencing interference" as recited in representative claim 1. Appellants also did not demonstrate error in the Examiner's findings with respect to claims 12 and 17. Accordingly, for the reasons described above, we sustain the Examiner's rejection of independent claims 1, 12 and 17, and dependent claims 8 and 9, not separately argued.

Claim 2

Appellants' arguments directed to claim 2 assert that the Examiner's finding (Ans. 5, 8) that Gan meets the claim does not constitute a prima facie case of obviousness because "[t]here is no language in the cited passage that the <u>scanning</u> step is <u>performed</u> <u>upon the commencement of data transmission</u>." (Reply Br. 4). The Examiner generally found that Gan performs the step on start-up (i.e., data transmission) of the communications network. (Ans. 5, 8). We find this to be a reasonable interpretation of Gan and claim 2 (*see* FF 5, 7), bolstered by our additional finding noted *supra*, that Gan uses the term "rescanning," (col. 21, l. 22), which necessarily means initial scanning and data transmission occurred (FF 5). Appellants do not define scanning, data transmission, or commencement, and do not dispute the finding that Gan's system sends data on start-up or any time thereafter. (FF 5, 7). We find that Gan's system initially scans from power-up, and continuously thereafter during normal data transmission of many

forms of data, including, but not limited to, special data packets, or null data packets during the RSSI test from the master and/or the preamble test from the slaves (FF 2, 5). Thus, simply powering up a slave and/or a master constitutes commencement of data transmission.

Thus, Appellants' mere recitation of claim limitations, and general assertions regarding other Gan teachings (*see* App. Br. 7-9), do not demonstrate error in the Examiner's position nor meet the Appellants' burden on appeal.[2] Accordingly, we have no basis upon which to find error in the Examiner's position and we sustain the rejection of claim 2.

Claim 3

Appellants' arguments directed to claim 3 assert that the Examiner's finding (Ans. 5) that Gan meets the claim does not constitute a prima facie case of obviousness because "[t]here is no language in the cited passages that teaches that the scanning step is performed upon each passage of a first time period." (App. Br. 10). The Examiner found that Gan teaches selecting another set of communications channels "after expiration of a specified length of time." (Ans. 5, *quoting* Gan, col. 4, ll. 1-6). The Examiner also found that Gan teaches a periodic selection of channels (Ans. 5). Appellants do not define each passage of a first time period or otherwise refute the Examiner's findings, with which we concur (FF 5), as to what Gan teaches at the cited passages.

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[2] "A statement which merely points out what a claim recites will not be considered an argument for separate patentability of the claim." 37 C.F.R. § 41.37(c) (1) (vii).

Thus, Appellants' mere recitation of claim limitations, and general assertions regarding other Gan teachings, do not demonstrate error in the Examiner's position nor meet the Appellants' burden on appeal. Accordingly, having no basis upon which to find error in the Examiner's position, we sustain the Examiner's rejection of claim 3.

Claims 4 and 13

Appellants' arguments directed to claims 4 and 13 assert that the Examiner's finding (Ans. 5) that Gan meets the claim does not constitute a prima facie case of obviousness because "[t]here is no language in the cited passages that teaches that the scanning step is <u>repeated periodically during data transmission</u>." (App. Br. 11). As we stated *supra*, the Examiner found that Gan teaches a periodic selection of channels (Ans. 5). We see no distinction between the teaching, with which we concur (FF 5), and the argued claim language.

Thus, Appellants' mere recitation of claim limitations, and general assertions regarding other Gan teachings, do not demonstrate error in the Examiner's position nor meet the Appellants' burden on appeal. Accordingly, we have no basis upon which to find error in the Examiner's position.

Claims 5, 14, and 18

Appellants' arguments directed to claims 5, 14 and 18 assert that the Examiner's finding (Ans. 5) that Gan meets the claim does not constitute a prima facie case of obviousness because "[t]here is no language in the cited passages that teaches that the <u>scanning step</u> is <u>performed when a data</u>

throughput rate falls below a predefined value." (Reply Br. 5). The Examiner accurately quoted Gan (Ans. 5-6) to support the finding that Gan teaches selecting an initial set, and thereafter periodically, new sets, of channels based on one or more selection criteria, to adaptively avoid interference. As the Examiner also found, such criteria includes bit error rate, which, we find, at a minimum, reasonably relates to throughput, based upon the re-transmission of faulty data. (*See* Ans. 5-6; FF 5-7). Additionally, Gan's system rescans when "good" channels fall below a threshold, meeting the claim, because transmitted data may be lost as good channels change to bad channels. (FF 5-7).

Thus, Appellants' mere recitation of claim limitations, and general assertions regarding Gan's teachings, do not demonstrate error in the Examiner's position nor meet the Appellants' burden on appeal. Accordingly, we have no basis upon which to find error in the Examiner's position.

Claims 6, 15, and 19

Appellants' arguments directed to claims 6, 15 and 19 assert that the Examiner's finding (Ans. 5-7) that Gan meets the claim does not constitute a *prima facie* case of obviousness because "[t]here is no language in the cited passages that teaches that the scanning step is performed when requested by a user." (Reply Br. 6). The Examiner accurately quoted Gan (Ans. 5) to support the finding that Gan teaches a scanning step on start-up, as we generally also found above. We find, in general agreement with the Examiner, that a user implicitly requests such steps when starting the master

or slave device – i.e., turning it on to communicate. (*See* Ans. 5-6, *see* FF 5, 7).

Thus, Appellants' mere recitation of claim limitations, and general assertions regarding Gan's teachings, do not demonstrate error in the Examiner's position nor meet the Appellants' burden on appeal. Accordingly, having no basis upon which to find error in the Examiner's position, we sustain the Examiner's rejection of claims 6, 15, and 19.

Claims 7, 10, 11, 16, and 20

As the format of the Examiner's rejection indicates (*see* Ans. 5-6), claims 7, 16 and 20 merely respectively recite, *inter alia*, limitations of claims 3 through 5, 13 through 15, and 18 through 19 in alternative forms. Appellants present no separate arguments for patentability with respect to these claims, or with respect to claims 10 and 11. (App. Br. 13-15). Accordingly, for the reasons noted above, we have no basis upon which to find error in the Examiner's position. Thus, we sustain the rejections of 7, 10, 11, 16, and 20.

CONCLUSION

Appellants did not demonstrate that the Examiner erred in finding that Gan teaches the disputed limitations.

DECISION

We affirm the Examiner's decision rejecting claims 1 through 20.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

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